Chapter 7
COMMON OPERATIONAL PICTURE (COP)

701 INTRODUCTION

a. Situational awareness is of vital importance to both warfighters and Commanders in that it enables them to make more-informed decisions. The COP provides a Commander the ability to see, at a glance, the true disposition of all forces and ships within his/her area of interest. Thus the COP is an essential decision-making tool and a force multiplier.

b. Within a MNTG, tactical situational awareness can be provided from data/information received from organic sensors being captured and displayed on combat data systems. However, this data, while real-time, is limited in coverage to the extent of the TG/TU dispositions and their sensor capabilities. On the other hand, the COP provides near real-time information to the Commander from a theatre-wide perspective. This picture is often enriched from information sources external to a MNTG, and includes land and air tracks.

702 AIM

This chapter describes the COP and its dissemination in a MTWAN environment.

703 OVERVIEW

a. The COP is an amalgamation or fusion of data and information from a number of combined and/or joint sensors, data-links and other sources into a single (or common) operational picture. The COP provides Near-Real Time (NRT) (current, planned or projected) disposition and amplifying information on friendly, hostile, neutral and unknown forces / units in the sea, land, air and space environments through a Graphical User Interface (GUI).

b. Other products such as imagery, mapping and weather / oceanography may be overlaid. Ideally future information such as force status, logistic, weather and intelligence is integrated to increase the overall value of the information. This information is either in the form of overlays or can be ‘pulled down’ by opening windows; (providing a ‘drill-down’ capability).

c. At the tactical level, access to the COP augments situational awareness while

at the operational and strategic levels it provides an authoritative picture or theatre-wide overview. Traditionally the COP has been disseminated to maritime forces through satellite Information eXchange Sub-Systems (IXS) or via a High Interest Tracks (HITS) broadcast. Both are inefficient and costly to support because they are 'stovepipes' and require dedicated subnets. New COP dissemination techniques employing Internet Protocol (IP) allow the convergence of COP information onto the one maritime tactical network. These IP COP methods provide for the more timely delivery of track information.

704 REQUIREMENT

It is essential a Commander has confidence in the COP, and therefore willing to act on the information displayed. To this end, the information must be:

a. **Accurate -** it must convey the true situation.

b. **Relevant -** it must apply to the mission, task, or situation at hand.

c. **Timely -** it must be received in time to make the right decisions.

d. **Useable -** it must be in easy to understand format and displays.

e. **Complete -** it must contain all the information necessary to make an informed decision.

f. **Concise -** it must contain the level of detail required.

g. **Secure -** it must be afford adequate protection.

h. **Common -** data and tracks must be identical across the theatre.

705 TOP COP (FUSION AND FILTERING)

a. The TOP COP denotes a hierarchical architecture where information is fused (merged, enriched, correlated and if necessary de-conflicted) from subordinate pictures so that the 'TOP COP' has a fully integrated and accurate picture. This is then fed back down to subordinate pictures, which are updated. The COP Synchronisation Tool (CST) seamlessly provides much of this capability, to sites that have sufficient bearer bandwidth. The use of a Force Over-the-horizon Track Coordinator (FOTC) ensures COP fusion at the tactical level where CST is often not available.

b. At the tactical level, an important requirement is to ensure relevancy. This also adheres to IM principles and requires coordinators to be able to filter unwanted information captured at operational and strategic levels. The principle here is "keep it relevant". It is unlikely that a tactical Commander

needs information from outside of his area of interest.

706 COP MANAGEMENT

a. The COP is a distributed fused picture. In order to achieve a "synchronised" fused picture with multiple units that may all be reporting similar pictures a method of synchronisation is necessary. Traditionally this has been accomplished procedurally by the designation of a FOTC who maintains responsibility for all tracks within the AOR. The COP Synchronisation Tool (CST) provides a "distributed" rather than "dictated" management of the database. There are three methods of COP Management as follows:

(1) **FOTC**. Traditional COP management has been achieved through the establishment of a FOTC, which correlates and associates, where possible, the various source track data and then provides a "dictated and validated" broadcast back to the participants. The validated track database is centrally managed and maintained within the TF/TG.

(2) **CST**. CST enables the unit that has the most information on a particular track with the ability to be the one responsible for managing that track within the database. Based on TCP/IP communication protocols, CST provides the user with faster, more reliable communications and an improved synchronized picture.

(3) **DUAL FOTC/CST**. In many cases there are requirements to support both CST and FOTC. A CST / FOTC Gateway platform enables units within a TF/TG to receive the benefits of a CST fused picture.

707 COP DISSEMINATION

a. CSTMdxNET/CST. CSTMdxNET is the transport protocol associated with CST. It enables the transmission of COP track data via TCP/IP. The minimum recommended bandwidth to participate in a CST environment is 40 kbps. Platforms not meeting these bandwidth criteria should continue the use of the traditional FOTC-based broadcast.

b. **UID.** Unit Identifier (UID) is a TCP/IP transport protocol that enables the transmission of Over The Horizon (OTH) Gold Formatted messages. This requires less oversight than OTCIX/HITS/FOTC Broadcast and yields greater commonality in the database. Within a maritime tactical WAN environment the use of UID is the simplest mechanism for COP distribution but carries a large overhead because the dissemination is unicast.

c. **NETPREC.** NETPREC is subset of UID that enables FOTC to group units for dissemination of tailored COP. NETPREC is designed for LAN application and is seldom used within a WAN environment.

708 MULTICAST TRANSPORT SERVICE

The Multicast Service Gateway (MSeG) is a reliable packet assembler software program that will receive the TCP/IP COP feed (FOTC or CST), and rebroadcast them using a reliable MDP transport service. The MSeG host at each site receives the multicast MDP service and delivers each IP "data-gram" via a local TCP/IP connection to a local host running software compatible with the Global Command and Control System- Maritime (GCCS-M). The use of MSeG dramatically increases network efficiency.

709 ARCHITECTURE

a. Figures 7-1 and 7-2 provide the generic architecture for the generation and distribution of the COP. They show both a top-down and bottom-up approach in that strategic and theatre information is assimilated and passed downwards at the shore NOC, while a force picture is generated and passed upwards.

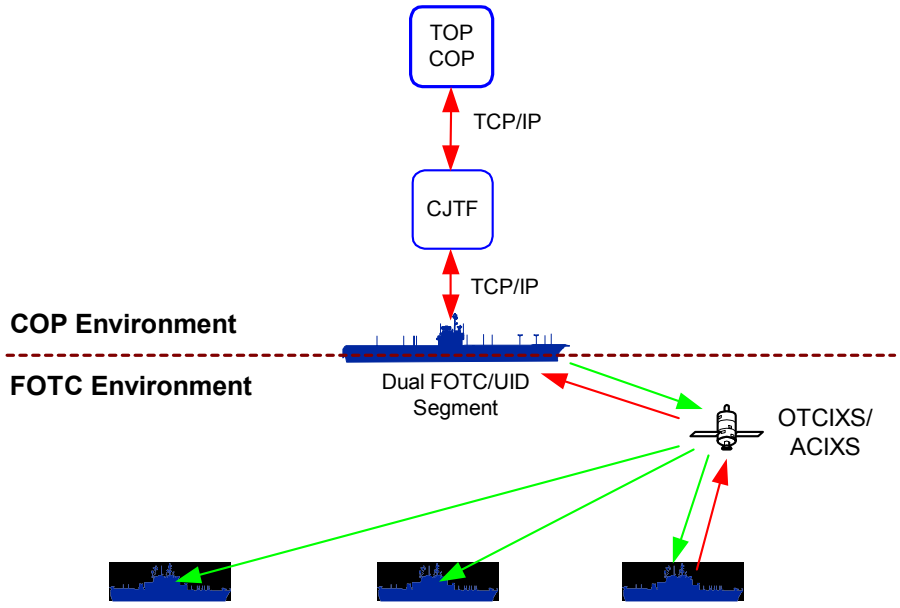

Figure 7-1: Traditional Environment (with IXS networks and CST)

b. Figure 7-2 represents a full IP environment with CST operating upwards from the MCC and subordinate units participating via MSeG or UID.

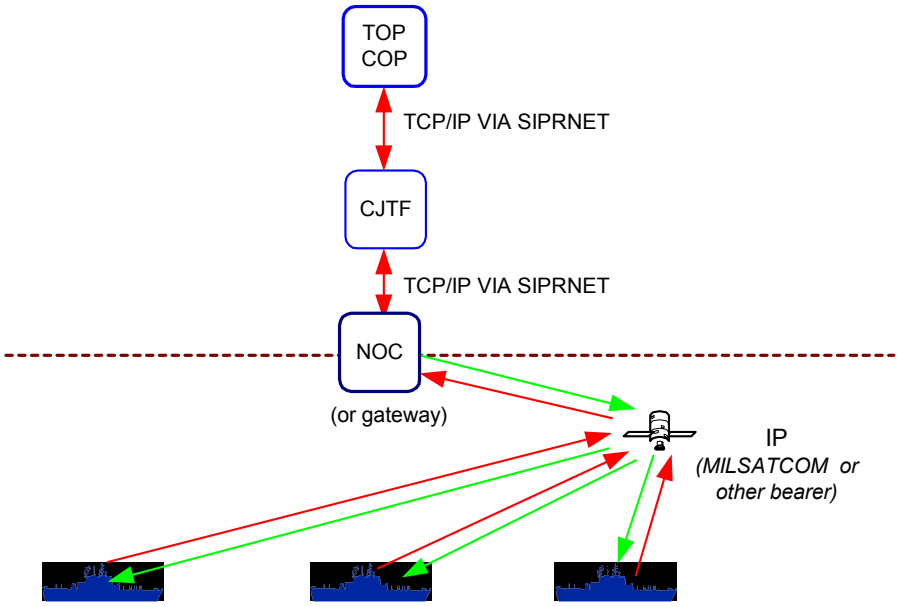

Figure 7-2: Full IP Environment (MTWAN)

c. The World Wide OPTASK Force Over-the-Horizon Track Coordinator (FOTC) provides detail on construction, compilation, collation and dissemination of the COP. CTF will promulgate variations in COP procedures specific to local operations in an OPTASK FOTC Supplement. Necessary guidance for supporting the COP using MSeG on a MTWAN should be promulgated in the OPTASK NET.

710 SELECTION OF APPROPRIATE COP DISSEMINATION METHOD

The following table provides guidance for the selection of COP dissemination.

Method	Transport Service	Description	Considerations
CST	CSTMdxNET	• Reporting responsibility assigned to unit with best track information. • Synchronised track databases • Automatic process • Utilises TCP/IP	• Not recommended unless WAN bandwidth 64Kbps or greater • Can be employed with 20 Kbps bandwidth with degradation in service (i.e. functionality)
FOTC	UID	• Maintains FOTC procedures • Dictated and validated COP • Simple and efficient	• Point to Point

Method	Transport Service	Description	Considerations
		• Utilises TCP/IP	
FOTC	MSeG	• Packet assembler enabling multicast of COP via TCP/IP • Has a Broadcast mode	• FOTC procedures unclear • Higher track latency • Can be utilised in EMCON
FOTC	IXS	• Maintains FOTC procedures • Dictated and validated COP • Has a Broadcast mode • Legacy system	• Dedicated stovepipe system (independent of network traffic) • Higher track latency • Can be utilised in EMCON

Table 7-1. COP Dissemination Methods

711 SUMMARY

a. The COP is a vital tool for improving the Commander's situation awareness and aiding in decision making. However, the COP is only as good as the information fed into it and, conversely, could seriously damage situational awareness if allowed to become out of date or contain inaccurate, irrelevant or incomplete data. In fact, an inaccurate picture is worse than *no picture at all* because it can cause the wrong decisions to be made, possibly with devastating results. Consequently, a Commander will have confidence in the COP *only* if he/she knows that the system is reliable and accurate. This can only be achieved through users being knowledgeable, aware of the system requirements and diligent in its upkeep.

b. The ability to display global track information through stovepipe IXS networks will soon be replaced by integration onto IP networks. In the case of Allied nations, this will be via a MTWAN. This will allow the COP to be displayed and viewed through a variety of media that will continue to provide a picture, even during EMCON restrictions (radio silence). Conversely, it also means that units not capable of accessing a MTWAN, may not be able to view the same picture within the same timeframe. Commanders must therefore be aware of the capabilities and limitations of the units within their force.